163450 [redacted]

[redacted]

PA Scoresheets

Site Name: CARUS CHEMICAL CO.
Date: 6-25-91

GENERAL INFORMATION (continued)

Source Descriptions:

CARUS CHEMICAL CO. PRODUCES WASTE WHICH IS A BY-PRODUCT OF ITS MANUFACTURING PROCESS WHICH INVOLVES THE USE OF ORES CONTAINING MANGANESE, CESIUM AND CERIUM. THE UNUSEABLE PORTION OF THE ORE IS PLACED IN LARGE ROLL-BOXES AND IS HAULED TO A PERMITTED LANDFILL ON A DAILY BASIS. PROCESS WATER ENTERS A 4-ACRE SETTLING AND TREATMENT POND AND THEN ENTERS THE LITTLE VERMILION RIVER.

Waste Characteristics (WC) Calculations:

See PA Table 1, page 5)

MAXIMUM NUMBER OF CUBIC YARDS OF WASTE ON-SITE:

50 yds^3

PILE $\leq 250\ yds^3$ = WC score of 18

SURFACE IMPOUNDMENT (SOUTH SETTLING & TREATMENT POND):

4 ACRES = WC SCORE OF 100

WC = 100

Determining the Waste Characteristics (WC) Score: WC, based on waste quantity, may be determined by one or all of four measures called "tiers": constituent quantity, wastestream quantity, source volume, and source area. PA Table 1a (page 5) is structured according to these tiers. The amount and level of detail of information available to you determine which tier(s) you can use for each source. For each source, evaluate waste quantity for as many of the tiers as you have information to support, and select the result that gives you the highest WC score. For any one source or for all sources at a site, if no information is available regarding waste quantity, assign a WC score of 18 (minimum).

PA Table 1a has 6 columns: column 1 indicates the quantity tier; column 2 lists source types for the four tiers; columns 3, 4, and 5 provide ranges of waste amount for sites with only one source, which correspond to WC scores at the tops of the columns (18, 32, or 100); column 6 provides formulas to obtain source waste quantity (WQ) values at sites with multiple sources.

To determine WC for sites with only one source:

1. *Identify source type (see definitions).*
2. *Examine all waste quantity data available.*
3. *Estimate the mass and/or dimensions of each source.*
4. *Determine which quantity tiers you can use based on available source information.*
5. *Convert source measurements to appropriate units for each tier you can evaluate for the source.*
6. *Identify the range into which the total quantity falls for each tier evaluated (PA Table 1a).*
7. *Determine the highest WC score obtained for any tier (18, 32, or 100, at top of PA Table 1a columns 3, 4, and 5, respectively).*
8. *Use this WC score for all pathways.* *

To determine WC for sites with multiple sources:

1. *Identify each source type (see definitions).*
2. *Examine all waste quantity data available for each source.*
3. *Estimate the mass and/or dimensions of each source.*
4. *Determine which quantity tiers you can use for each source based on the available information.*
5. *Convert the measurements to the appropriate units for each tier you can evaluate for each source.*
6. *For each source, use the formulas in column 6 of PA Table 1a to determine the WQ value for each tier that can be evaluated. The highest WQ value obtained for any tier is the WQ value for the source.*
7. *Sum the WQ values for all sources to get the site WQ total.*
8. *Use the site WQ total from step 7 to assign the WC score from PA Table 1b.*
9. *Use this WC score for all pathways.* *

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* The WC score is considered in all four pathways. However, if there are primary targets for ground water, surface water, or air migration pathways, assign the determined WC or a score of 32, whichever is greater, as the WC score for that pathway.

Site Name: CARUS CHEMICAL CO
Date: 6-25-91

PA TABLE 1: WASTE CHARACTERISTICS (WC) SCORES

PA Table 1a: WC Scores for Single Source Sites and Formulas for Multiple Source Sites

TIER	SOURCE TYPE	SINGLE SOURCE SITES (assigned WC scores)			MULTIPLE SOURCE SITES
		WC = 18	*WC = 32*	*WC = 100*	Formula for Assigning Source WQ Values
CONSTITUENT	N/A	≤100 lbs	>100 to 10,000 lbs	>10,000 lbs	*lbs ÷ 1*
WASTESTREAM	N/A	≤500,000 lbs	>500,000 to 50 million lbs	>50 million lbs	*lbs ÷ 5,000*
VOLUME	Landfill	≤6.75 million ft³ ≤250,000 yd³	>6.75 million ft³ to 675 million ft³ >250,000 to 25 million yd³	>675 million ft³ >25 million yd³	*ft³ ÷ 67,500* *yd³ ÷ 2,500*
	Surface impoundment	≤6,750 ft³ ≤250 yd³	>6,750 ft³ to 675,000 ft³ >250 to 25,000 yd³	>675,000 ft³ >25,000 yd³	*ft³ ÷ 67.5* *yd³ ÷ 2.5*
	Drums	≤1,000 drums	>1,000 to 100,000 drums	>100,000 drums	*drums ÷ 10*
	Tanks and non-drum containers	≤50,000 gallons	>50,000 to 5 million gallons	>5 million gallons	*gallons ÷ 500*
	Contaminated soil	≤6.75 million ft³ ≤250,000 yd³	>6.75 million ft³ to 675 million ft³ >250,000 to 25 million yd³	>675 million ft³ >25 million yd³	*ft³ ÷ 67,500* *yd³ ÷ 2,500*
	Pile	≤6,750 ft³ ≤250 yd³	>6,750 ft³ to 675,000 ft³ >250 to 25,000 yd³	>675,000 ft³ >25,000 yd³	*ft³ ÷ 67.5* *yd³ ÷ 2.5*
AREA	Landfill	≤340,000 ft² ≤7.8 acres	>340,000 to 34 million ft² >7.8 to 780 acres	>34 million ft² >780 acres	*ft² ÷ 3,400* *acres ÷ 0.078*
	Surface impoundment	≤1,300 ft² ≤0.029 acres	>1,300 to 130,000 ft² >0.029 to 2.9 acres	>130,000 ft² >2.9 acres	*ft² ÷ 13* *acres ÷ 0.00029*
	Contaminated soil	≤3.4 million ft² ≤78 acres	>3.4 million to 340 million ft² >78 to 7,800 acres	>340 million ft² >7,800 acres	*ft² ÷ 34,000* *acres ÷ 0.78*
	Pile*	≤1,300 ft² ≤0.029 acres	>1,300 to 130,000 ft² >0.029 to 2.9 acres	>130,000 ft² >2.9 acres	*ft² ÷ 13* *acres ÷ 0.00029*
	Land treatment	≤27,000 ft² ≤0.62 acres	>27,000 to 2.7 million ft² >0.62 to 62 acres	>2.7 million ft² >62 acres	*ft² ÷ 270* *acres ÷ 0.0062*

1 ton = 2,000 lbs = 1 yd³ = 4 drums = 200 gallons

* Use area of land surface under pile, not surface area of pile.

PA Table 1b: WC Scores for Multiple Source Sites

WQ Total	*WC Score*
>0 to 100	18
>100 to 10,000	32
>10,000	100

GROUND WATER PATHWAY

Ground Water Use Description: Provide information on ground water use in the vicinity. Present the general stratigraphy, aquifers used, and distribution of private and municipal wells.

Calculations of Ground Water Drinking Water Populations: Provide populations from private wells and municipal supply systems in each distance ring. Show apportionment calculations for blended supply systems.

Site Name: CARUS CHEMICAL CO.
Date: 6-25-91

GROUND WATER PATHWAY
GROUND WATER USE DESCRIPTION

Describe Ground Water Use Within 4-miles of the Site:
Provide generalized stratigraphy; information on aquifers, municipal, and or private wells)

CARUS CHEMICAL CO. IS LOCATED IN AN AREA OF WISCONSIN GLACIAL TILL. BEDROCK CONSISTS OF HIGHLY FRACTURED SILURIAN AND ORDOVICIAN-AGED DOLOMITES AND THE ST. PETER SANDSTONE.

THE NEAREST MUNICIPAL WELL IS APPROXIMATELY .7 MILE FROM THE SITE AND IS PART OF THE GROUP OF FOUR WELLS WHICH THE CITY OF LaSalle USES FOR ITS TOTAL WATER SUPPLY. THESE WELLS ARE IN THE SAND AND GRAVEL AQUIFER AT DEPTHS RANGING FROM 60-70 FEET DEEP. THE CITY OF PERU, WHICH IS LOCATED DIRECTLY WEST OF LaSalle, DRAWS ITS WATER FROM THE ST. PETERS SANDSTONE AT DEPTHS OF 2,591 FT. TO 2,764 FT.

THE CLOSEST KNOW PRIVATE WELL IS LOCATED APPROXIMATELY 1½ MILES EAST-NORTHEAST OF THE SITE AND DRAWS WATER FROM A CRACKED LIMESTONE FORMATION AND IS 160 FEET DEEP

THE TOWN OF OGLESBY HAS 2 MUNICIPAL WELLS WHICH ARE LOCATED APPROXIMATELY 3¼ MILES SE OF CARUS CHEMICAL.

Show calculations of ground water drinking water populations:

PRIVATE WELL POPULATION:

¼	½	1	2	3	4
0	0	21	132	342	334

CITY OF LaSalle POPULATION:

¼	½	1	2	3	4
0	0	9,446	0	0	0

CITY OF PERU POPULATION

¼	½	1	2	3	4
0	0	0	0	10,866	0

CITY OF OGLESBY POPULATION (PIETY HOLL-JONESVILLE)

¼	½	1	2	3	4
0	0	0	0	0	4373

CITY OF NORTH UTICA POPULATION

¼	½	1	2	3	4
0	0	0	0	0	533

TOTAL POPULATION

¼ - 0
½ - 0
1 - 9467
2 - 132
3 - 11208
4 - 5242

GROUND WATER PATHWAY CRITERIA LIST

Site Name: CARUS CHEMICAL CO
Date: 6-25-91

This chart provides guidelines to assist you in hypothesizing the presence of a suspected release and identifying primary targets. It is expected that not all of this information will be available during the PA. Also, these criteria are not all-inclusive; list any other criteria you use to hypothesize a suspected release or to identify primary targets. This chart will record your professional judgment in evaluating these factors.

The "Suspected Release" section of the chart guides you through evaluation of some site, source, and pathway conditions to help hypothesize whether a release from the site is likely. If a release is suspected, use the "Primary Targets" section to guide you through evaluation of some conditions that will help identify targets likely to be exposed to hazardous substances. You may use this section of the chart more than once, depending on the number of targets you feel may be considered "primary." In the "Primary Targets" section on this sheet, record the responses for the well that you feel has the highest probability of being exposed to hazardous substances.

Check the boxes to indicate a "yes", "no", or "unknown" answer to each question. If you check the "Suspected Release" box as "yes", make sure that you assign a Likelihood of Release value of 550 for the pathway.

GROUND WATER PATHWAY

SUSPECTED RELEASE

Yes	No	Unknown	
☐	☒	☐	Are sources poorly contained?
☐	☒	☐	Is the source a type likely to contribute to ground water contamination (e.g., wet lagoon)?
☐	☒	☐	Is waste quantity particularly large?
☐	☒	☐	Is precipitation heavy and infiltration rate high?
☐	☒	☐	Is the site located in an area of karst terrain?
☐	☒	☐	Is the subsurface highly permeable or conductive?
☒	☐	☐	Is drinking water drawn from a shallow aquifer?
☐	☒	☐	Are suspected contaminants highly mobile in ground water?
☐	☒	☐	Does any circumstantial evidence of ground water or drinking water contamination exist?
☐	☐		Other criteria? NONE
☐	☒		**SUSPECTED RELEASE?**

PRIMARY TARGETS

Yes	No	Unknown	
☐	☐	☐	Is any drinking-water well nearby?
☐	☐	☐	Is any nearby drinking-water well closed?
☐	☐	☐	Has foul-tasting or foul-smelling water been reported by any nearby drinking-water users?
☐	☐	☐	Do any nearby wells have a large drawdown or high production rate?
☐	☐	☐	Are drinking-water wells located between the site and other wells that are suspected to be exposed to hazardous substances?
☐	☐	☐	Does any circumstantial evidence of ground water or drinking water contamination exist?
☐	☐	☐	Does any drinking-water well warrant sampling?
☐	☐		Other criteria? _____
☐	☐		**PRIMARY TARGET(S) IDENTIFIED?**

Summarize the rationale for suspected release (attach an additional page if necessary):

NO RELEASE IS SUSPECTED TO HAVE OCCURRED TO GROUNDWATER

Summarize the rationale for Primary Targets (attach an additional page if necessary):

IEPA FILES; CONVERSATIONS WITH LOCAL WATER OPERATORS; PWS MICROFICHE FILES; 1990 CENSUS DATA

GROUND WATER PATHWAY

Pathway Characteristics

Answer the questions at the top of the page. Refer to the Ground Water Pathway Criteria List (page 7) to hypothesize whether you suspect that hazardous substances associated with the site have been released to ground water (GW). Record the depth to the aquifer (in feet): the difference between the deepest depth of waste deposited and the shallowest depth of the top of the aquifer at or as near as possible to the site. Note whether the site is in karst terrain (characterized by abrupt ridges, sink holes, caverns, springs, disappearing streams). State the distance (in feet) from any source to the nearest well used for drinking water.

Likelihood of Release (LR)

1. **Suspected Release:** Hypothesize based on professional judgment guided by the Ground Water Pathway Criteria List (page 7). Remember to use only Column A for this pathway if you score a suspected release to ground water, and do not evaluate factor 2.

2. **No Suspected Release:** If you do not suspect a release, determine the GW LR score based on depth to aquifer or whether the site is in an area of karst terrain. If you do not suspect a release to ground water, remember to use only Column B to score this pathway.

Targets (T)

Evaluates the threat to populations who obtain their drinking water from GW supplies. To apportion populations served by blended drinking-water supply systems, determine the percentage of population served by each well within the 4-mile target distance limit based on its production.

3. **Primary Target Population:** Populations served by any drinking-water wells that you suspect have been exposed to hazardous substances released from the site. Use professional judgment guided by the Ground Water Pathway Criteria List (page 7) to make this determination. In the space provided, enter the population served by any wells you suspect have been exposed to hazardous substances from the site. If only the number of residences is known, use the average county residents per household (rounded to the next integer) to determine population served. Multiply the population by 10 to determine the Primary Target Population score. Note that if you do not suspect a release, there is no Primary Target Population.

4. **Secondary Target Population:** Populations served by any drinking-water wells within four miles of the site that you do not suspect have been exposed to hazardous substances should be evaluated on PA Table 2a or 2b (used for wells drawing from karst aquifers) (page 9). Circle the assigned value for the population in each distance ring and enter it in the column on the far right side of the table. Sum the far right column and enter the total as the Secondary Target Population factor score.

5. **Nearest Well** represents the threat posed to the well that is most likely to be exposed to hazardous substances. If you have identified a Primary Target Population, enter 50. Otherwise, obtain the Nearest Well value from PA Table 2a or 2b for the closest distance category with a drinking-water well population.

6. **Wellhead Protection Area (WHPA):** WHPAs are special areas designated by States for protection under Section 1428 of the Safe Drinking Water Act. Local/State and EPA Regional water officials can provide information regarding the location of WHPAs.

7. **Resources:** Score automatically assigned. Do not override; do not investigate resources.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release). Note that if there are no drinking-water wells within the target distance limit, the total targets score for either Column A or Column B will be 5 (automatically assigned for resources).

Waste Characteristics (WC)

8. **Waste Characteristics** score is assigned from page 4. However, if any Primary Target has been identified for GW, assign the higher of the score calculated on page 4 or a score of 32.

Ground Water Pathway Score: Multiply the scores for LR, T, and WC. Divide the product by 82,500. Round the result to the nearest integer. If the result is greater than 100, assign 100.

Site Name: CARUS CHEMICAL CO.
Date: 6-25-91

GROUND WATER PATHWAY SCORESHEET

Pathway Characteristics		
Do you suspect a release (see Ground Water Pathway Criteria List, page 7)?	Yes ___	No X
Is the site located in karst terrain?	Yes ___	No X
Depth to aquifer:	60	ft
Distance to the nearest drinking-water well:	4000	ft

LIKELIHOOD OF RELEASE	A Suspected Release	B No Suspected Release	References
1. SUSPECTED RELEASE: If you suspect a release to ground water (see page 7), assign a score of 550, and use only column A for this pathway.	(550)		1
2. NO SUSPECTED RELEASE: If you do not suspect a release to ground water, and the site is in karst terrain or the depth to aquifer is 70 feet or less, assign a score of 500; otherwise, assign a score of 340. Use only column B for this pathway.		(500 or 340) 500	2
LR =		500	

TARGETS			
3. PRIMARY TARGET POPULATION: Determine the number of people served by drinking water from wells that you suspect have been exposed to hazardous substances from the site (see Ground Water Pathway Criteria List, page 7). ___ people x 10 =			3
4. SECONDARY TARGET POPULATION: Determine the number of people served by drinking water from wells that you do NOT suspect have been exposed to hazardous substances from the site, and assign the total population score from PA Table 2. Are any wells part of a blended system? Yes ___ No X If yes, attach a page to show apportionment calculations.		424	4
5. NEAREST WELL: If you have identified any Primary Targets for ground water, assign a score of 50; otherwise, assign the highest Nearest Well score from PA Table 2. If no drinking-water wells exist within 4 miles, assign a score of zero.	(50, 20, 10, 8, 6, 4, 2, or 0)	(20, 10, 9, 5, 3, 2, or 0) 9	5
6. WELLHEAD PROTECTION AREA (WHPA): Assign a score of 20 if any portion of a designated WHPA is within ¼ mile of the site; assign 5 if from ¼ to 4 miles.	(20, 5, or 0)	(20, 5, or 0) 0	6
7. RESOURCES: A score of 5 is assigned.	(5) 5	(5) 5	
T =		438	

WASTE CHARACTERISTICS			
8. A. If you have identified any Primary Targets for ground water, assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.	(100 or 32)		
B. If you have NOT identified any Primary Targets for ground water, assign the waste characteristics score calculated on page 4.	(100, 32, or 18)	(100, 32, or 18) 100	
WC =		100	

GROUND WATER PATHWAY SCORE: $\frac{LR \times T \times WC}{82.500}$ = (maximum of 100) 100

Site Name: CARUS CHEMICAL CO
Date: 6-25-91

PA TABLE 2: VALUES FOR SECONDARY GROUND WATER TARGET POPULATIONS

PA Table 2a: Non-Karst Aquifers

Distance from Site	Population	Nearest Well (choose highest)	Population Served by Wells Within Distance Category: 1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	Population Value
0 to ¼ mile	0	20	1	2	5	16	52	163	521	1,633	5,214	16,325	0
> ¼ to ½ mile	0	18	1	1	3	10	32	101	323	1,012	3,233	10,121	0
> ½ to 1 mile	9467	(9)	1	1	2	5	17	52	(167)	522	1,668	5,224	167
> 1 to 2 miles	132	5	1	1	1	(3)	9	29	94	294	939	2,938	3
> 2 to 3 miles	11208	3	1	1	1	2	7	21	68	(212)	678	2,122	212
> 3 to 4 miles	5240	2	1	1	1	1	4	13	(42)	131	417	1,306	42
Nearest Well =												Score =	424

PA Table 2b: Karst Aquifers

Distance from Site	Population	Nearest Well (use 20 for karst)	Population Served by Wells Within Distance Category: 1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	Population Value
0 to ¼ mile		20	1	2	5	16	52	163	521	1,633	5,214	16,325	
> ¼ to ½ mile		20	1	1	3	10	32	101	323	1,012	3,233	10,121	
> ½ to 1 mile		20	1	1	3	8	26	82	261	816	2,607	8,162	
> 1 to 2 miles		20	1	1	3	8	26	82	261	816	2,607	8,162	
> 2 to 3 miles		20	1	1	3	8	26	82	261	816	2,607	8,162	
> 3 to 4 miles		20	1	1	3	8	26	82	261	816	2,607	8,162	
Nearest Well =												Score =	

SURFACE WATER PATHWAY

Migration Route Sketch: Sketch the surface water migration pathway illustrating the drainage route and identifying water bodies, the probable point of entry, flows, and targets.

SURFACE WATER PATHWAY CRITERIA LIST

Site Name: CARUS CHEMICAL CO.
Date: 6-25-91

This chart provides guidelines to assist you in hypothesizing the presence of a suspected release and identifying primary targets. It is expected that not all of this information will be available during the PA. Also, these criteria are not all-inclusive; list any other criteria you use to hypothesize a suspected release or to identify primary targets. This chart will record your professional judgment in evaluating these factors.

The "Suspected Release" section of the chart guides you through evaluation of some site, source, and pathway conditions to help hypothesize whether a release from the site is likely. If a release is suspected, use the "Primary Targets" section to guide you through evaluation of some conditions that will help identify targets likely to be exposed to hazardous substances. You may use this section of the chart more than once, depending on the number of targets you feel may be considered "primary." In the "Primary Targets" section on this sheet, record the responses for the target that you feel has the highest probability of being exposed to hazardous substances.

Check the boxes to indicate a "yes", "no", or "unknown" answer to each question. If you check the "Suspected Release" box as "yes", make sure that you assign a Likelihood of Release value of 550 for the pathway.

SURFACE WATER PATHWAY

SUSPECTED RELEASE

Yes	No	Unknown	
X	☐	☐	Is surface water nearby?
☐	X	☐	s waste quantity particularly large?
☐	X	☐	s the drainage area large?
☐	X	☐	Is precipitation heavy or infiltration rate low?
☐	X	☐	Are sources poorly contained or prone to runoff or flooding?
X	☐	☐	Is a runoff route well defined (e.g., ditch or channel leading to surface water)?
☐	X	☐	Is vegetation stressed along the probable runoff path?
☐	X	☐	Are suspected contaminants highly persistent in surface water?
☐	X	☐	Are sediments/water unnaturally discolored?
☐	X	☐	Is wildlife unnaturally absent?
☐	X	☐	Has deposition of waste into surface water been observed?
☐	X	☐	Is ground water discharge to surface water likely?
☐	X	☐	Is there any circumstantial evidence of surface water contamination?
☐	☐		Other criteria? _____
☐	X		**SUSPECTED RELEASE?**

PRIMARY TARGETS

Yes	No	Unknown	
☐	☐	☐	Is any target nearby? If yes:
			☐ Drinking-water intake
			☐ Fishery
			☐ Sensitive environment
☐	☐	☐	Has an intake, fishery, or recreational area been closed?
☐	☐	☐	Is there any circumstantial evidence of surface water contamination at or downstream of a target?
☐	☐	☐	Does any target warrant sampling? If yes:
			☐ Drinking-water intake
			☐ Fishery
			☐ Sensitive environment
☐	☐		Other criteria? _____
☐	☐		**PRIMARY INTAKE(S) IDENTIFIED?**
☐	☐		**PRIMARY FISHERY IDENTIFIED?**
☐	☐		**PRIMARY SENSITIVE ENVIRONMENT(S) IDENTIFIED?**

Summarize the rationale for suspected release (attach an additional page if necessary):

NO RELEASE IS SUSPECTED

Summarize the rationale for Primary Targets (attach an additional page if necessary):

ILL. FISHING GUIDE - ILL. DOC - DIVISION OF FISHERIES; PWS MICROFICHE FILES; WETLAND INVENTORY MAPS; IEPA LAND AND WATER DIVISION FILES; ILL. DEPT. OF CONSERVATION — ID OF ENVIRONMENTAL SENSITIVE AREAS

SURFACE WATER PATHWAY

Pathway Characteristics

The surface water pathway includes three threats: Drinking Water Threat, Human Food Chain Threat, and Environmental Threat. Answer the questions at the top of the page. Refer to the Surface Water Pathway Criteria List (page 11) to hypothesize whether you suspect hazardous substances have been released to surface water. Enter the distance to surface water (the shortest overland drainage distance from a source to a surface water body). State the floodplain in which the site is located (e.g., 100-yr, 200-yr). If the site is located in more than one floodplain, use the most frequent flooding event. Identify surface water uses for the 15-mile surface water migration path.

Likelihood of Release (LR)

1. **Suspected Release:** Hypothesize based on professional judgment guided by the Surface Water Pathway Criteria List (page 11). Remember to use only Column A for this pathway if you score a suspected release to surface water, and do not evaluate factor 2.

2. **No Suspected Release:** Determine score based on the shortest overland drainage distance from a source to a surface water body. If distance to surface water is greater than 2,500 feet, determine this score based on flood frequency. Remember to use only Column B to score this pathway if you do not suspect that hazardous substances have been released.

Drinking Water Threat Targets (T)

3. List all drinking-water intakes on downstream surface water bodies within the 15-mile target distance limit. Provide the intake name, the type of water body on which the intake is located, the flow of the water body, and the number of people served by the intake (apportion the population if part of a blended system).

4. **Primary Target Population:** Evaluate any populations served by drinking-water intakes that you suspect have been exposed to hazardous substances released from the site. Use professional judgment guided by the Surface Water Pathway Criteria List (page 11) to make this determination. In the space provided, enter the population served by all intakes you suspect have been exposed to hazardous substances, and multiply by 10 to derive the Primary Target Population score. Remember, if you do not suspect a release, there is no Primary Target Population.

5. **Secondary Target Population:** On PA Table 3 (page 13), evaluate any populations served by drinking-water intakes that you do not suspect have been exposed to hazardous substances. Enter the population served by intakes for each flow category. Circle the assigned population value and enter it in the far right column. Sum the population values and enter the total as the Secondary Target Population score.

Gauging station data for most surface water bodies should be available from USGS or other sources. In the absence of gauging station data, see PA Table 4 (page 13) for a listing of surface water body types and associated flow categories. The flow for lakes is determined by the sum of flows of streams entering or leaving the lake. Note that the flow category "mixing zone of quiet flowing rivers" can be used for rivers with flows of at least 10 cfs, but only for intakes within 3 miles of the probable point of entry.

6. **Nearest Intake** score represents the threat posed to the drinking-water intake that is most likely to be exposed to hazardous substances. If you have identified a Primary Target Population, assign a score of 50. Otherwise assign the score determined from PA Table 3 (page 13) for the lowest-flowing water body on which there is an intake.

7. **Resources:** Score automatically assigned. Do not override; do not investigate resources.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

Site Name: CARUS CHEMICAL Co
Date: 6-25-91

SURFACE WATER PATHWAY
LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT SCORESHEET

Pathway Characteristics	
Do you suspect a release (see Surface Water Pathway Criteria List, page 11)?	Yes ___ No X
Distance to surface water:	700 ft
Flood Frequency:	500 yrs
What is the downstream distance to the nearest drinking-water intake?	>15 miles
nearest fishery? 0 miles nearest sensitive environment?	0.2 miles

LIKELIHOOD OF RELEASE	A *Suspected Release*	B *No Suspected Release*	*References*
1. SUSPECTED RELEASE: If you suspect a release to surface water (see page 11), assign a score of 550, and use only column A for this pathway.	(550)		7
2. NO SUSPECTED RELEASE: If you do not suspect a release to surface water, and the distance to surface water is 2,500 feet or less, assign a score of 500; otherwise, assign a score from the table below. Use only column B for this pathway.		(500, 400, 300 or 100) 500	8
LR =	(550)	(500, 400, 300 or 100) 500	

Floodplain	*Score*
Site in annual or 10-yr floodplain	500
Site in 100-yr floodplain	400
Site in 500-yr floodplain	300
Site outside 500-yr floodplain	100

DRINKING WATER THREAT TARGETS

3. Determine the water body types, flows (if applicable), and number of people served by all drinking-water intakes within the 15-mile target distance limit. If there are no drinking-water intakes within the target distance limit, assign a total Targets score of 5 at the bottom of this page (Resources only) and proceed to page 14.

Intake Name	*Water Body Type*	*Flow*	*People Served*
NONE		___ cfs	
		___ cfs	
		___ cfs	

9

4. PRIMARY TARGET POPULATION: If you suspect any drinking-water intake listed above has been exposed to hazardous substances from the site (see Surface Water Pathway Criteria List, page 11), list the intake name(s) and calculate the factor score based on the number of people served.

___, ___

___ people x 10 = 10

5. SECONDARY TARGET POPULATION: Determine the Secondary Target Population score from PA Table 3 based on the populations using drinking-water from intakes that you do NOT suspect have been exposed to hazardous substances from the site.

Are any intakes part of a blended system? Yes ___ No ___
If yes, attach a page to show apportionment calculations.

0 — 11

6. NEAREST INTAKE: If you have identified any Primary Targets for the drinking water threat (Factor 4), assign a score of 50; otherwise, assign the Nearest Intake score from PA Table 3. If no drinking-water intake exists within the 15-mile target distance limit, assign a score of zero.

(50, 20, 10, 2, 1, or 0) 0 — 12

7. RESOURCES: A score of 5 is assigned.

(5) 5 | (5) 5

T = 5

Site Name: CARUS CHEMICAL CO
Date: 6-25-91

PA TABLE 3: VALUES FOR SECONDARY SURFACE WATER TARGET POPULATIONS

Surface Water Body Flow Characteristics (see PA Table 4)	Population	Nearest Intake (choose highest)	Population Served by Intakes Within Flow Category											Population Value
			1 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000	
< 10 cfs	0	20	2	5	16	52	163	521	1,633	5,214	16,325	52,136	163,246	0
10 to 100 cfs	0	2	1	1	2	5	16	52	163	521	1,633	5,214	16,325	0
> 100 to 1,000 cfs	0	1	0	0	1	1	2	5	16	52	163	521	1,633	0
> 1,000 to 10,000 cfs	0	0	0	0	0	0	1	1	2	5	16	52	163	0
> 10,000 cfs or Great Lakes	0	0	0	0	0	0	0	0	1	1	2	5	16	0
3 mile Mixing Zone	0	10	1	3	8	26	82	261	816	2,607	8,162	26,068	81,663	0
Nearest Intake =		0											Score =	0

PA TABLE 4: SURFACE WATER TYPE / FLOW CHARACTERISTICS WITH DILUTION WEIGHTS FOR SECONDARY SURFACE WATER SENSITIVE ENVIRONMENTS

Type of Surface Water Body			Dilution Weight
Water Body Type	OR	Flow Characteristics	
minimal stream		flow less than 10 cfs	1
small to moderate stream		flow 10 to 100 cfs	0.1
moderate to large stream		flow greater than 100 to 1,000 cfs	N/A
large stream to river		flow greater than 1,000 to 10,000 cfs	N/A
large river		flow greater than 10,000 cfs	N/A
3 mile mixing zone of quiet flowing streams or rivers		flow 10 cfs or greater	N/A
coastal tidal water (harbors, sounds, bays, etc.), ocean, or Great Lakes		N/A	N/A

SURFACE WATER PATHWAY HUMAN FOOD CHAIN THREAT

Likelihood of Release (LR)

LR is the same for all threats in the Surface Water Pathway. Enter the LR score determined on page 12.

Human Food Chain Threat Targets (T)

8. The only human food chain targets are fisheries. A fishery is "any area of a surface water body from which food chain species are taken or could be taken for human consumption on a subsistence, sporting, or commercial basis." Food chain organisms include fish, shellfish, crustaceans, amphibians, and amphibious reptiles. Fisheries are delineated by changes in surface water body type (i.e., streams and rivers, lakes, coastal tidal waters, and oceans/Great Lakes) and whenever the flow characteristics of a stream or river change. In the space provided, identify all fisheries within the 15-mile target distance limit. Indicate the surface water body type and stream flow for each fishery. Gauging station data should be available for most surface water bodies from USGS or other sources. In the absence of gauging station data, see PA Table 4 (page 13) for a listing of surface water body types and associated flow categories. The flow for lakes is determined by the sum of flows of streams entering or leaving the lake. Note that, if there are no fisheries within the 15-mile target distance limit, the Human Food Chain Threat Targets score is zero; and you should proceed to the Environmental Threat evaluation.

9. **Primary Fisheries** are any fisheries within the 15-mile target distance limit that you suspect have been exposed to hazardous substances released from the site. Use professional judgment guided by the Surface Water Pathway Criteria List (page 11) to make this determination. If you identify any Primary Fisheries, enter 300 as the Primary Fisheries factor score, and do not evaluate Secondary Fisheries. Note that if you do not suspect a release, there are no Primary Fisheries.

10. **Secondary Fisheries:** Evaluate fisheries that you do not suspect have been exposed to hazardous substances. Determine the lowest flow for which you have identified a Secondary Fishery. Use this flow to select the Secondary Fisheries score from the table. Enter the score into either Column A or Column B.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

Site Name: CARUS CHEMICAL CO.
Date: 6-25-91

SURFACE WATER PATHWAY (continued)
HUMAN FOOD CHAIN THREAT SCORESHEET

	A	B	
LIKELIHOOD OF RELEASE	*Suspected Release*	*No Suspected Release*	*References*
Enter the Surface Water Likelihood of Release score from page 12. LR =		500	

HUMAN FOOD CHAIN THREAT TARGETS

8. Determine the water body types and flows (if applicable) for all fisheries within the 15-mile target distance limit. If there are no fisheries within the target distance limit, assign a Targets score of 0 at the bottom of this page and proceed to page 15.

Fishery Name	*Water Body Type*	*Flow*
LITTLE VERMILLION RIVER	STREAM	10-100 cfs
ILLINOIS RIVER	RIVER	2500 cfs
		cfs
		cfs
		cfs

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9. PRIMARY FISHERIES: If you suspect any fishery listed above has been exposed to hazardous substances from the site (see Surface Water Criteria List, page 11), assign a score of 300 and do not evaluate Factor 10. List the Primary Fisheries:

_____, _____,
_____, _____.

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10. SECONDARY FISHERIES: If you have not identified any Primary Fisheries, assign a Secondary Fisheries score from the table below using the LOWEST flow at any fishery within the 15-mile target distance limit.

Lowest Flow	*Secondary Fisheries Score*
< 10 cfs	210
10 to 100 cfs	30
> 100 cfs, coastal tidal waters, oceans, or Great Lakes	12

30

15

T = 30

SURFACE WATER PATHWAY ENVIRONMENTAL THREAT

Likelihood of Release (LR)

LR is the same for all threats in the Surface Water Pathway. Enter the LR score determined on page 12.

Environmental Threat Targets (T)

11. There are many different types of Environmental Targets. Refer to PA Table 5 (page 16) for a listing of sensitive environments that are evaluated for the Surface Water Pathway Environmental Threat. In the space provided, identify all sensitive environments located within the 15-mile target distance limit. Indicate the surface water body type and flow at each sensitive environment. Gauging station data for most surface water bodies should be available from USGS or other sources. In the absence of gauging station data, see PA Table 4 (page 13) for a listing of surface water body types and associated flow categories. The flow for lakes is determined by the sum of flows of streams entering or leaving the lake. Note that, if there are no sensitive environments within the 15-mile target distance limit, the Environmental Targets score is zero; and you should proceed to the Waste Characteristics evaluation.

12. **Primary Sensitive Environments** are surface water sensitive environments within the 15-mile target distance limit that you suspect have been exposed to hazardous substances released from the site. Use professional judgment guided by the Surface Water Pathway Criteria List (page 11) to make this determination. If you identify any Primary Sensitive Environments, enter 300 as the Primary Sensitive Environments factor score, and do not evaluate Secondary Sensitive Environments. Note that if you do not suspect a release, there are no Primary Sensitive Environments.

13. **Secondary Sensitive Environments** are surface water sensitive environments that you do not suspect have been exposed to hazardous substances. If you have identified Secondary Sensitive Environments, eveluate them based on flow by the following process: if there are any Secondary Sensitive Environments on surface water bodies with flows of 100 cfs or less, list them in the table. Use PA Table 4 (page 13) to determine the appropriate dilution weight(s).

Use PA Tables 5 and 6 (page 16) to determine the appropriate value for sensitive environment type. When measuring length of wetlands that are located on both sides of a surface water body, sum the frontage areas. For sensitive environments that fall into more than one of the categories listed in PA Table 5, sum the values for each type to determine the environment value. For examole, a wetland of 1.5 miles total length (value of 50) that is also a critical habitat for a Federally endangered species (value of 100) would receive an environment value of 150.

For each sensitive environment, multiply the dilution weight by the environment type/length of wetlands value and record the product in the far right column. Sum the values in the far right column and enter the total as the Secondary Sensitive Environments score. Do not evaluate any other Secondary Sensitive Environments. However, if all Secondary Sensitive Environments are on surface water bodies with flows of greater than 100 cfs, assign a Secondary Sensitive Environments score of 10.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

Site Name:
Date:

SURFACE WATER PATHWAY (continued)
ENVIRONMENTAL THREAT SCORESHEET

LIKELIHOOD OF RELEASE	A Suspected Release	B No Suspected Release	References
Enter the Surface Water Likelihood of Release score from page 12. LR =	≥501	500, 400, 300 or 100	
		500	

ENVIRONMENTAL THREAT TARGETS

11. Determine the water body types and flows (if applicable) for all surface water sensitive environments within the 15-mile target distance limit (see PA Tables 4 and 5). If there are no sensitive environments within the 15-mile target distance limit, assign a Targets score of 0 at the bottom of this page, and proceed to page 17.

Environment Name	Water Body Type	Flow
LITTLE VERMILLION RIVER	STREAM	10-100 cfs
ILLINOIS RIVER	RIVER	2500 cfs
		cfs
		cfs
		cfs

16

12. PRIMARY SENSITIVE ENVIRONMENTS: If you suspect any sensitive environment listed above has been exposed to hazardous substances from the site (see Surface Water Criteria List, page 11), assign a score of 300 and do not evaluate Factor 13. List the Primary Sensitive Environments:

300 or 0

17

13. SECONDARY SENSITIVE ENVIRONMENTS:

A. For Secondary Sensitive Environments on surface water bodies with flows of 100 cfs or less, assign scores as follows, and do not evaluate part B of this factor:

Flow	Dilution Weight (PA Table 4)	Environment Type and Value (PA Tables 5 and 6)	Total
10-100 cfs	0.1 x	WETLANDS (¼ mi) 25 =	2.5
2500 cfs	N/A x	WETLANDS (1 3-4 mi) 350 =	0
2500 cfs	N/A x	STATE WILDLIFE MGT (25) =	0
cfs	x	=	
cfs	x	=	0

Sum = 2.5

B. If NO Secondary Sensitive Environments are located on surface water bodies with flows of 100 cfs or less, assign a score of 10.

10 or 0

0

18

T = 2.5

Site Name: CARUS CHEMICAL
Date: 6-25-91

PA TABLE 5: SURFACE WATER AND AIR SENSITIVE ENVIRONMENTS VALUES

Sensitive Environment	Assigned Value
Critical habitat for Federally designated endangered or threatened species	100
Marine Sanctuary	
National Park	
Designated Federal Wilderness Area	
Ecologically important areas identified under the Coastal Zone Wilderness Act	
Sensitive Areas identified under the National Estuary Program or Near Coastal Water Program of the Clean Water Act	
Critical Areas identified under the Clean Lakes Program of the Clean Water Act (subareas in lakes or entire small lakes)	
National Monument	
National Seashore Recreation Area	
National Lakeshore Recreation Area	
Habitat known to be used by Federally designated or proposed endangered or threatened species	75
National Preserve	
National or State Wildlife Refuge	
Unit of Coastal Barrier Resources System	
Federal land designated for the protection of natural ecosystems	
Administratively Proposed Federal Wilderness Area	
Spawning areas critical for the maintenance of fish/shellfish species within a river system, bay or estuary	
Migratory pathways and feeding areas critical for the maintenance of anadromous fish species in a river system	
Terrestrial areas utilized by large or dense aggregations of vertebrate animals (semi-aquatic foragers) for breeding	
National river reach designated as recreational	
Habitat known to be used by State designated endangered or threatened species	50
Habitat known to be used by a species under review as to its Federal endangered or threatened status	
Coastal Barrier (partially developed)	
Federally designated Scenic or Wild River	
→ State land designated for wildlife or game management 13 MI DOWNSTREAM	25
State designated Scenic or Wild River	
State designated Natural Area	
Particular areas, relatively small in size, important to maintenance of unique biotic communities	
State designated areas for the protection/maintenance of aquatic life under the Clean Water Act	5
Wetlands	See PA Table 6 (Surface Water Pathway) or PA Table 9 (Air Pathway)

PA TABLE 6: SURFACE WATER WETLANDS FRONTAGE VALUES

Total Length of Wetlands	Assigned Value
Less than 0.1 mile	0
0.1 to 1 mile	25
Greater than 1 to 2 miles	50
Greater than 2 to 3 miles	75
Greater than 3 to 4 miles	100
Greater than 4 to 8 miles	150
Greater than 8 to 12 miles	250
Greater than 12 to 16 miles	350
Greater than 16 to 20 miles	450
Greater than 20 miles	500

SURFACE WATER PATHWAY WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE

Waste Characteristics (WC)

14. **Waste Characteristics** score is assigned from page 4. However, if any Primary Target has been identified for any surface water threat, assign the higher of the score calculated on page 4 or a score of 32.

Surface Water Pathway Threat Scores

Fill in the matrix with the appropriate scores from the previous pages. To calculate the score for each threat: multiply the scores for LR, T and WC, divide the product by 82,500, and round the result to the nearest integer. The Drinking Water Threat and Human Food Chain Threat are subject to a maximum of 100. The Environmental Threat is subject to a maximum of 60. Enter the rounded threat scores into the right side of the table.

Surface Water Pathway Score

Sum the individual threat scores to determine the Surface Water Pathway Score. If the sum is greater than 100, assign 100.

Site Name: CARUS CHEMICAL CO.
Date: 6-25-91

SURFACE WATER PATHWAY (concluded)
WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE SUMMARY

WASTE CHARACTERISTICS	A *Suspected Release*	B *No Suspected Release*
14. A. If you have identified ANY Primary Targets for surface water (pages 12, 14, or 15), assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.		
B. If you have NOT identified any Primary Targets for surface water, assign the waste characteristics score calculated on page 4.		
WC =		100

SURFACE WATER PATHWAY THREAT SCORES

Threat	*Likelihood of Release (LR) Score (from page 12)*	*Targets (T) Score*	*Pathway Waste Characteristics (WC) Score (determined above)*	*Threat Score LR x T x WC / 82,500*
Drinking Water	500	5	100	3
Human Food Chain	500	30	100	18
Environmental	500	2.5	100	2 (1.513)

SURFACE WATER PATHWAY SCORE
(Drinking Water Threat + Human Food Chain Threat + Environmental Threat)

23

SOIL EXPOSURE PATHWAY CRITERIA LIST

Site Name: CARUS CHEMICAL CO
Date: 6-25-91

This chart provides guidelines to assist you in hypothesizing the presence of a resident population. It is expected that not all of this information will be available during the PA. Also, these criteria are not all-inclusive; list any other criteria you use to hypothesize resident populations. This chart will record your professional judgment in evaluating this factor.

Use the resident population section to guide you through evaluation of some site and source conditions that will help identify targets likely to be exposed to hazardous substances. You may use this section of the chart more than once, depending on the number of nearby people you feel may be considered part of a resident population. Record the responses for the resident population target that you feel has the highest probability of being exposed to hazardous substances.

Check the boxes to indicate a "yes", "no", or "unknown" answer to each question.

SOIL EXPOSURE PATHWAY				
SUSPECTED CONTAMINATION	***RESIDENT POPULATION***			
	Yes	No	Unknown	
Surficial contamination is assumed.	☐	☒	☐	Are there residences, schools, or day care facilities on or within 200 feet of areas of suspected contamination?
	☐	☒	☐	Are residences, schools, or day care facilities located on adjacent land previously owned or leased by the site owner/operator?
	☐	☒	☐	Is there an overland migration route that might spread hazardous substances near residences, schools, or day care facilities?
	☐	☒	☐	Are there any reports of adverse health effects from onsite or adjacent residents or students, exclusive of apparent drinking water or air contamination problems?
	☐	☒	☐	Does any offsite property warrant sampling?
	☐	☐		Other criteria? _____
	☒	☐		**RESIDENT POPULATION IDENTIFIED?**

Summarize the rationale for resident population (attach an additional page if necessary):

1980 & 1990 U.S. CENSUS DATA

SITE RECONNAISSANCE OF 5-22-91

INTERVIEW WITH FACILITY REPRESENTATIVES

U.S.G.S. TOPOGRAPHIC QUADRANGLE MAPS

SOIL EXPOSURE PATHWAY

Pathway Characteristics

Answer the questions at the top of the page. Identify people who are most likely to be regularly exposed to contamination at the site because they work at the facility or reside or attend school or day care on or within 200 feet of an area of suspected contamination. If the site is active, estimate the number of full or part-time workers at this facility. Note that evaluation of targets is based on current site conditions.

Likelihood of Exposure (LE)

1. **Suspected Contamination:** The PA always assumes that surficial contamination exists. **Do not override this assumption.** Surficial contamination often exists even if wastes have been "removed" or are believed to be buried below the surface. A 550 is automatically assigned for this factor; only Column A can be scored for this pathway.

Resident Population Threat Targets (T)

2. **Resident Population** corresponds to "primary targets" for the migration pathways. Determine if there are people living or attending school or day care on or within 200 feet of areas of suspected contamination. Use professional judgment guided by the Soil Exposure Pathway Criteria List (page 18) to make this determination. Record the number of people identified as Resident Population. Multiply this population by 10 to determine the Resident Population factor score.

3. **Resident Individual:** If you have identified a Resident Population, assign a score of 50. Otherwise, assign a score of 0.

4. **Workers:** Estimate the number of full and part-time workers regularly present at this facility and other facilities where contamination is suspected. Assign a score for the workers factor from the table.

5. **Terrestrial Sensitive Environments:** In the table provided, list each Terrestrial Sensitive Environment located on areas of suspected contamination. Use PA Table 7 (page 20) to assign a value for each sensitive environment. Sum the values of all the terrestrial sensitive environments and assign the total as the factor score.

6. **Resources:** Score automatically assigned. **Do not override;** do not investigate resources.

Target Scoring Instructions: Sum the target scores in Column A.

Waste Characteristics (WC)

7. Enter the WC score determined on page 4. There is no exception for this pathway.

Soil Exposure Pathway Score: Calculate the **Resident Population Threat Score** by multiplying the scores for LE, T, and WC, and dividing the product by 82,500. Round the threat score to the nearest integer. If the result is greater than 100, assign 100. The **Nearby Population Threat Score** is always 2 for the PA; do not override this score. Add these 2 points to the calculated **Resident Population Threat Score** to determine the Soil **Exposure Pathway Score**, subject to a maximum of 100.

Site Name: CARUS CHEMICAL CO.
Date: 6-25-91

SOIL EXPOSURE PATHWAY SCORESHEET

Pathway Characteristics	
Do any people live on or within 200 ft of areas of suspected contamination?	Yes ___ No X
Do any people attend school or day care on or within 200 ft of areas of suspected contamination?	Yes ___ No X
Is the facility active? Yes X No ___ If yes, estimate the number of workers: 105	

		A Suspected Contamination	B No Suspected Contamination	References
LIKELIHOOD OF EXPOSURE				
1. SUSPECTED CONTAMINATION: Surficial contamination is assumed. A score of 550 is assigned.	LE =	[550] 550		19
RESIDENT POPULATION THREAT TARGETS				
2. RESIDENT POPULATION: Determine the number of people occupying residences or attending school or day care on or within 200 feet of areas of suspected contamination (see Soil Exposure Pathway Criteria List, page 18). _____ people x 10 =		0		20
3. RESIDENT INDIVIDUAL: If you have identified any Resident Population (Factor 2), assign a score of 50; otherwise, assign a score of 0.		[50 or 0] 0		21
4. WORKERS: Assign a score from the following table based on the total number of workers at the facility and nearby facilities with suspected contamination:		[15, 10, 5, or 0] 10		22
5. TERRESTRIAL SENSITIVE ENVIRONMENTS: Assign a value from PA Table 7 for each terrestrial sensitive environment that is located on an area of suspected contamination:	Sum =	0		23
6. RESOURCES: A score of 5 is assigned.		[5] 5		
	T =	15		
WASTE CHARACTERISTICS				
7. Assign the waste characteristics score calculated on page 4.	WC =	[100, 32, or 18] 100		

Number of Workers	Score
0	0
1 to 100	5
101 to 1,000	10
>1,000	15

Terrestrial Sensitive Environment Type	Value
NONE	

RESIDENT POPULATION THREAT SCORE: $\frac{LE \times T \times WC}{82{,}500}$ = [maximum of 100] 10

NEARBY POPULATION THREAT SCORE:
Assign a score of 2 = 2

SOIL EXPOSURE PATHWAY SCORE:
Resident Population Threat + Nearby Population Threat = [maximum of 100] 12

Site Name: CARUS CHEMICAL
Date: 6-25-91

PA TABLE 7: SOIL EXPOSURE PATHWAY
TERRESTRIAL SENSITIVE ENVIRONMENT VALUES

Terrestrial Sensitive Environment	*Assigned Value*
Terrestrial critical habitat for Federally designated endangered or threatened species National Park Designated Federal Wilderness Area National Monument	100
Terrestrial habitat known to be used by Federally designated or proposed threatened or endangered species National Preserve (terrestrial) National or State terrestrial Wildlife Refuge Federal land designated for protection of natural ecosystems Administratively proposed Federal Wilderness Area Terrestrial areas utilized by large or dense aggregations of animals (vertebrate species) for breeding	75
Terrestrial habitat used by State designated endangered or threatened species Terrestrial habitat used by species under review for Federally designated endangered or threatened status	50
State lands designated for wildlife or game management State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25

AIR PATHWAY CRITERIA LIST

Site Name: CARUS CHEMICAL Co
Date: 6-25-91

This chart provides guidelines to assist you in hypothesizing the presence of a suspected release. It is expected that not all of this information will be available during the PA. Also, these criteria are not all-inclusive; list any other criteria you use to hypothesize a suspected release. This chart will record your professional judgment in evaluating this factor.

The "Suspected Release" section of the chart guides you through evaluation of some conditions to help hypothesize whether a release from the site is likely. For the Air Pathway, if a release is suspected, "Primary Targets" are any residents, workers, students, or sensitive environments within ¼ mile of the site.

Check the boxes to indicate a "yes", "no", or "unknown" answer to each question. If you check the "Suspected Release" box as "yes", make sure that you assign a Likelihood of Release value of 550 for the pathway.

AIR PATHWAY

SUSPECTED RELEASE				PRIMARY TARGETS
Yes	No	Unknown		
☐	☒	☐	Have odors been reported?	*If you suspect a release to air, evaluate all populations and sensitive environments within ¼ mile (including those onsite) as Primary Targets.*
☐	☒	☐	Has a release of hazardous substances to the air been directly observed?	
☐	☒	☐	Are there any reports of adverse health effects (e.g., headaches, nausea, dizziness) potentially resulting from migration of hazardous substances through the air?	
☐	☒	☐	Is there any circumstantial evidence of an air release?	
☐	☒		Other criteria? _____	
☐	☒		**SUSPECTED RELEASE?**	

Summarize the rationale for suspected release (attach an additional page if necessary):

NO RELEASE SUSPECTED

Pathway Characteristics

Answer the questions at the top of the page. Refer to the Air Pathway Criteria List (page 21) to hypothesize whether you suspect hazardous substances have been released from the site to the air. Due to dispersion, releases to air are not as persistent as releases to water migration pathways and are much more difficult to detect. Develop hypotheses concerning the release of hazardous substances to air based on "real time" considerations. Record the distance (in feet) from any source to the nearest regularly occupied building.

Likelihood of Release (LR)

1. **Suspected Release:** Hypothesize based on professional judgment guided by the Air Pathway Criteria List (page 21). Remember to use only Column A for this pathway if you score a Suspected Release, and proceed to the target evaluation section.

2. **No Suspected Release:** If you do not score a Suspected Release, enter 500. Remember to use only Column B to score this pathway if you do not suspect hazardous substances are being released.

Targets (T)

3. **Primary Target Population** are those people subject to exposure from a suspected air release of hazardous substances from the site. Use professional judgment, guided by the Air Pathwey Criteria List (page 21), to make this determination. Note that if you do not suspect a releese, there are no primary population targets. If you score a Suspected Release, record the residential, student, and worker population located on or within ¼-mile of the site. Multiply this number of people by 10; enter the factor score in Column A.

4. **Secondary Target Population** are those people in distance categories not suspected to be subject to exposure from airborne hazardous substances. Determine the number of residents, students, and workers, and enter the summed population in PA Table 8 (page 23) for each distance category. Circle the population value for the distance category end record the value in the far right column of the table. Sum these values and enter the total as the factor score.

5. **Nearest Individual** represents the threat posed to the person most likely to be exposed to hazardous substances released from the site. If you have identified any Primary Population, enter 50. Otherwise, assign the score from the "Nearest Individual" column of PA Table 8 (page 23), for the nearest distance ring in which you have identified a Secondary Population.

6. **Primary Sensitive Environments:** List the sensitive environments (on or within ¼ mile of the site) subject to exposure from a suspected air releese of hazardous substances from the site. Assign values for sensitive environment type (from PA Table 5, page 16) and/or wetland acreege (from PA Table 9, page 23). Sum the values and enter the total as the factor score.

7. **Secondary Sensitive Environments:** On PA Table 10 (page 23), list the sensitive environments that are in distance categories within ½ mile not suspected to be subject to exposure from airborne hazardous substances. Assign a value for each environment (PA Tables 5 and 9). Record the value for each Secondary Sensitive Environment on PA Table 10 (page 23), and multiply by the distance weight for that distance category. Sum the products, and enter the total as the factor score.

8. **Resources:** Score automatically assigned. Do not override; do not investigate resources.

Target Scoring Instructions: Sum the target scores in Column A (Suspected Release) or Column B (No Suspected Release).

Waste Characteristics (WC)

9. **Waste Characteristics** score is assigned from page 4. However, if any Primary Target has been identified for the air pathway, assign the higher of the score calculated on page 4 or a score of 32.

Air Pathway Score: Multiply the scores for LR, T, and WC. Divide the product by 82,500. Round the result to the nearest integer. If the result is greater than 100, assign 100.

Site Name: CARUS CHEMICAL CO.
Date: 6-25-91

AIR PATHWAY SCORESHEET

Pathway Characteristics	
Do you suspect a release (see Air Pathway Criteria List, page 21)?	Yes ___ No X
Distance to the nearest individual:	0 ft

	A Suspected Release	B No Suspected Release	Reference
LIKELIHOOD OF RELEASE			
1. SUSPECTED RELEASE: If you suspect a release to air (see page 21), assign a score of 550, and use only column A for this pathway.	(550)		24
2. NO SUSPECTED RELEASE: If you do not suspect a release to air, assign a score of 500, and use only column B for this pathway.		(500) 500	25
LR =		500	
TARGETS			
3. PRIMARY TARGET POPULATION: Determine the number of people subject to exposure from a release of hazardous substances through the air (see Air Pathway Criteria List, page 21). ___ people x 10 =			26
4. SECONDARY TARGET POPULATION: Determine the number of people within the 4-mile target distance limit, and assign the total population score from PA Table 8.		79	27
5. NEAREST INDIVIDUAL: If you have identified any Primary Targets for the air pathway, assign a score of 50; otherwise, assign the highest Nearest Individual score from PA Table 8.	(50, 20, 7.2.1. or 0)	(20, 7.2.1. or 0) 20	28
6. PRIMARY SENSITIVE ENVIRONMENTS: Sum the sensitive environment values (PA Table 5) and wetland acreage values (PA Table 9) for environments subject to exposure from air hazardous substances (see Air Pathway Criteria List, page 21).			29
7. SECONDARY SENSITIVE ENVIRONMENTS: Use PA Table 10 to determine the score for secondary sensitive environments.		2-64	30
8. RESOURCES: A score of 5 is assigned.	(5) 5	(5) 5	
T =		106.64	
WASTE CHARACTERISTICS			
9. A. If you have identified any Primary Targets for the air pathway, assign the waste characteristics score calculated on page 4, or a score of 32, whichever is GREATER; do not evaluate part B of this factor.	(100 or 32)		
B. If you have NOT identified any Primary Targets for the air pathway, assign the waste characteristics score calculated on page 4.	(100, 32, or 18)	(100, 32, or 18) 100	
WC =		100	

AIR PATHWAY SCORE: $\dfrac{\text{LR x T x WC}}{82{,}500}$ = (subject to a maximum of 100) 65

64.63

Site Name: CARUS CHG .CAL CO.
Date: 6-25-91

PA TABLE 8: VALUES FOR SECONDARY AIR TARGET POPULATIONS

Distance from Site	Population	Nearest Individual (choose highest)	Population Within Distance Category: 1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000	Population Value
Onsite	105	(20)	1	2	5	(16)	52	163	521	1,633	5,214	16,325	52,136	163,246	16
>0 to ¼ mile	1035	20	1	1	1	4	13	(41)	130	408	1,303	4,081	13,034	40,811	4/
> ¼ to ½ mile	2069	2	0	0	1	1	3	(9)	28	88	282	882	2,815	8,815	9
> ½ to 1 mile	6229	1	0	0	0	1	1	3	(8)	26	83	261	834	2,612	8
>1 to 2 miles	6965	0	0	0	0	0	1	1	(3)	8	27	83	266	833	3
>2 to 3 miles	8212	0	0	0	0	0	1	1	(1)	4	12	38	120	376	1
>3 to 4 miles	3099	0	0	0	0	0	0	1	(1)	2	7	23	73	229	1
Nearest Individual =		20												Score =	79

PA TABLE 9: AIR PATHWAY VALUES FOR WETLAND AREA

Wetland Area	Assigned Value
Less than 1 acre	0
1 to 50 acres	25
Greater than 50 to 100 acres	75
Greater than 100 to 150 acres	125
Greater than 150 to 200 acres	175
Greater than 200 to 300 acres	250
Greater than 300 to 400 acres	350
Greater than 400 to 500 acres	450
Greater than 500 acres	500

PA TABLE 10: DISTANCE WEIGHTS AND CALCULATIONS FOR AIR PATHWAY SECONDARY SENSITIVE ENVIRONMENTS

Distance	Distance Weight	Sensitive Environment Type and Value (from PA Table 8 or 9)	Product
Onsite	0.10	x WETLAND 5.5A (25)	2.5
		x	
0-1/4 mi	0.025	x 0	0
		x	
		x	
1/4-1/2mi	0.0054	x WETLAND 8.5A 25	.135
		x	
		x	
		x	
Total Environments Score =			2.635

SITE SCORE CALCULATION

In the column labeled S, record the Ground Water Pathway score, the Surface Water Pathway score, the Soil Exposure Pathway score, and the Air Pathway score. Square each pathway score and record the result in the S^2 column. Sum the squared pathway scores. Divide the sum by 4, and take the square root of the result to obtain the **Site Score**.

Recommendation

Provide a recommendation for site disposition in accordance with EPA guidelines.

Site Name: CARUS CHEMICAL CO
Date: 6-25-91

SITE SCORE CALCULATION

	S	S^2
GROUND WATER PATHWAY SCORE (S_{gw}):	100	10,000
SURFACE WATER PATHWAY SCORE (S_{sw}):	23	529
SOIL EXPOSURE PATHWAY SCORE (S_{se}):	12	144
AIR PATHWAY SCORE (S_a):	65	4225
SITE SCORE:	$= \sqrt{\frac{S_{gw}^2+S_{sw}^2+S_{se}^2+S_a^2}{4}}$ =	61.03

RECOMMENDATION

SUMMARY

	YES	NO
1. Is there a high possibility of a threat to nearby drinking water wells by migration of hazardous substances in ground water?	☐	☐
A. If yes, identify the wells recommended for sampling during the SI. _____		
B. If yes, how many people are served by these threatened wells? _____		
2. Are any of the following suspected to have been exposed to hazardous substances through surface water migration from the site?		
A. Drinking water intake	☐	☐
B. Fishery	☐	☐
C. Sensitive environment: wetland, critical habitat, others	☐	☐
D. If yes, identify the targets recommended for sampling during the SI. _____ _____		
3. Do people reside or attend school or day care on or within 200 ft of any area of suspected contamination?	☐	☐
4. Are there public health concerns at this site that are not addressed by PA scoring considerations? If yes, explain: _____ _____	☐	☐

References

1. IEPA Land files; IEPA Water files.
2. Ref. 1 above.
3. N/A.
4. Conversations with local water operators.
5. Illinois State Water Survey Well Logs; PWS Microfiche files; conversations with local water operators.
6. REF 1 above.
7. REF 1 above.
8. FIA Flood Hazard Boundary Map, March 19, 1976, U.S. Department of Housing and Urban Development, for City of LaSalle, Il.
9. PWS Microfiche files; conversations with local water operators.
10. N/A.
11. REF 9 above.
12. REF 9 above.
13. USGS Topographic Maps; Illinois Water Resources Databook, Vol. 2, 1989.
14. N/A.
15. REF 13 above.
16. REF 13 above; Illinois Department of Conservation.
17. N/A.
18. Illinois Department of Conservation; Wetland Inventory Maps.
19. N/A.
20. 1980 U.S. Census; Site Reconnaissance of 5-22-91; Site

Representative Interview; USGS Topographic Quadrangle Maps.

21. REF 20 above.
22. REF 20 above.
23. Illinois Department of Conservation.
24. N/A.
25. IEPA Air Division files; IEPA Land Division files.
26. N/A.
27. USGS Topographic Quadrangle Maps; 1980 Census Data.
28. REF 27 above.
29. N/A.
30. Wetland Inventory Maps; Illinois Department of Conservation.